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Seventh Quarterly Progress Report
(October - December 1974)

"A Cloud Physics Investigation
Utilizing Skylab Data"

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The status of work in the designated task areas is as follows:

Task I - Transmittance

a. Oxygen "A" Band

No calculations of transmission were performed this quarter, however we anticipate doing a series of calculations of the integrated absorption over the entire band during the current quarter. (See Task VI for more details.)

b. $2.0\ \mu\text{m}$ CO_2 Band

We anticipate the Lowtran II program will be available for use during the current quarter.

Task II - Scattering Calculations

This task has been completed.

Task III - Cloud Models and Returned Signals

a. Cloud Models

This task has been completed.

b. Returned Signals

Pending completion of Task Ib and changes in our analysis procedure (see Task VI) we plan to combine the results of Tasks I, II, and III with instrumental response data to simulate results.

Task IV - Deconvolution Procedure

There has been no change in the status of this task area since the last progress report.

Task V - Background Meteorological Data

Some additional data was received from JSC during this reporting period.

Task VI - Analysis of Satellite Data

The major portion of our effort was devoted to analysis of satellite data. In the analysis two problem areas have

been encountered. Despite the improvement in wavelength determination reported last quarter, it appears that we can not determine the specific in-and out-of-band wavelength (763 and 754 nm respectively) to sufficient accuracy. Accordingly we are investigating the use of the integrated band absorption in place of the specific absorption at 763 nm.

The second problem is illustrated in Figures 1 and 2. In Figure 2 the somewhat paradoxical result is shown in which the intensity of reflected sunlight is greater at 790 nm than it is at 740 nm. This is somewhat surprizing in that the sun is about 1.1 times more intense at 740 nm than 790 nm. Data from other instruments also show this effect. Our tentative explanation is water vapor. We hope to investigate this further using the Lowtran II program.

Subsequent analysis by both NESS and JSC personnel indicate that out-of-band radiation is not a serious problem for all of the Cloud Physics frequencies.

Travel - No travel was performed during this reporting period.

Sept. 10, 1973 Coastal Stratus

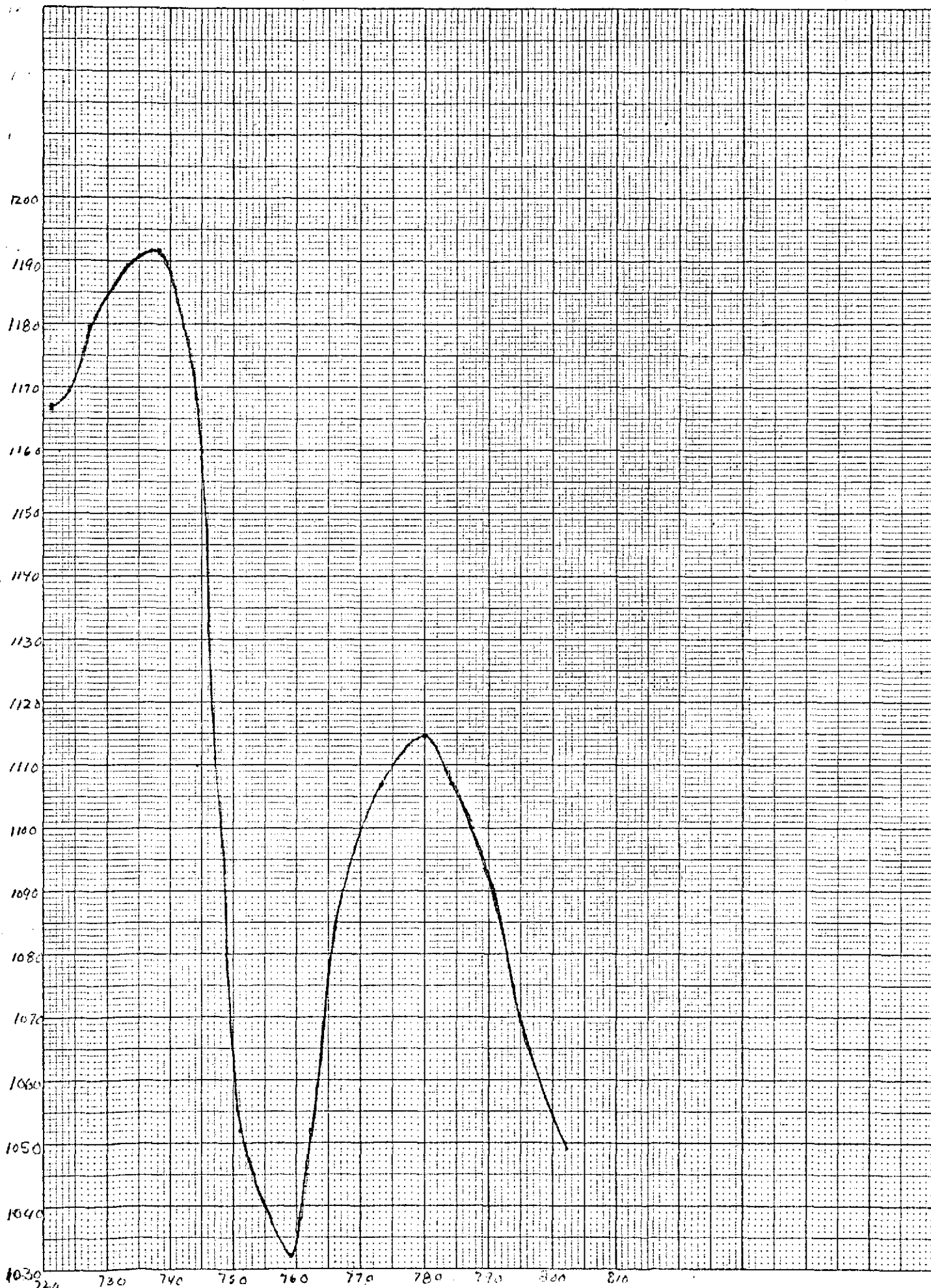


FIG. 1

λ (nm)

Jan. 12, 1974

Snow fields

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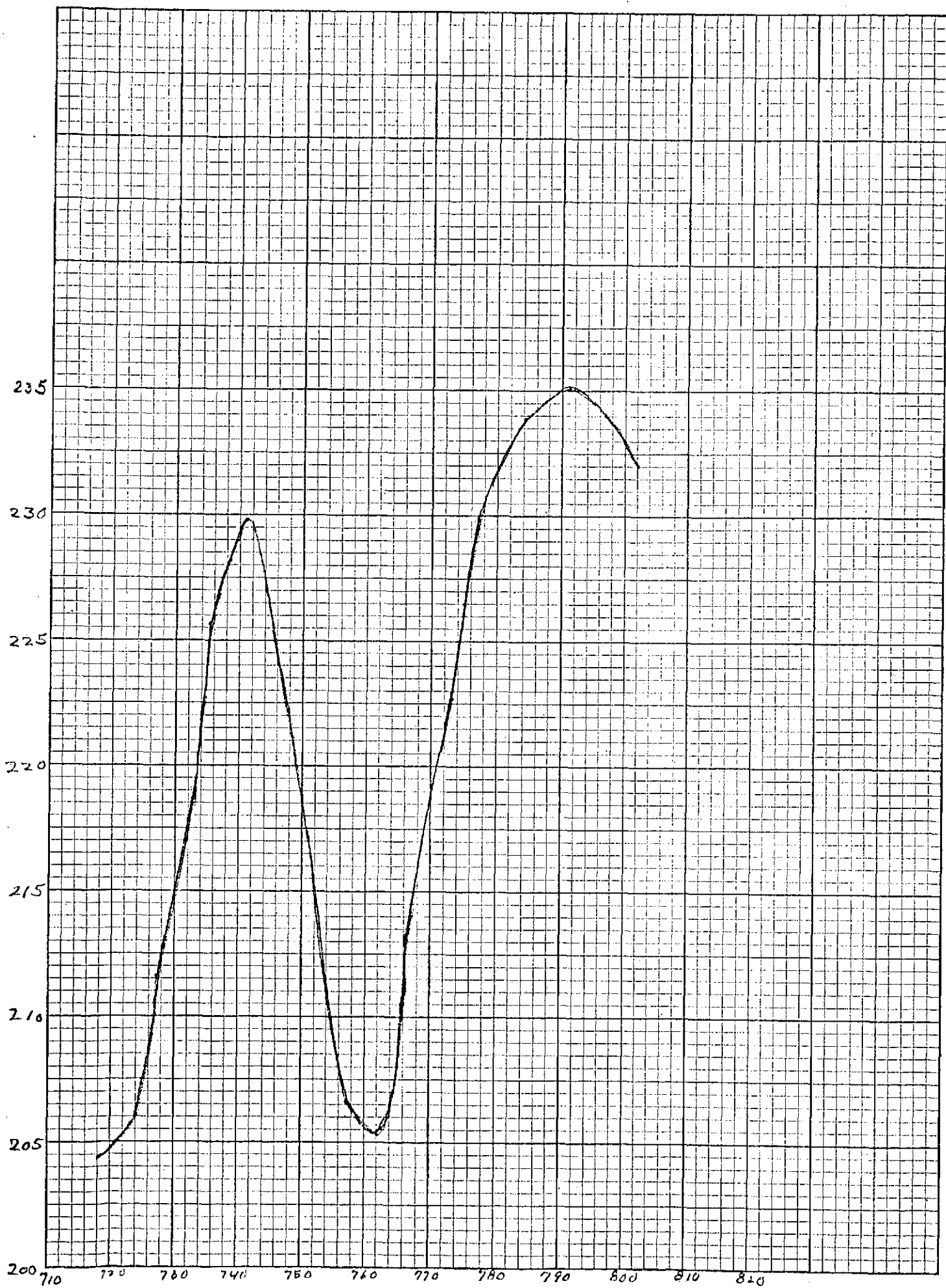


FIG. 2

λ (nm)